CLAIMS

1. An optical device (100) for converting WDM signals, whose pulses are simultaneous and carried by different wavelengths ($\lambda1$, $\lambda2$, $\lambda3$, $\lambda4$), into an OTDM signal, whose components are carried by the same wavelength ($\lambda4$) and time shifted (t1, t2, t3, t4), which device is characterized in that it comprises:

- shifting means (102, 103, 104) adapted to introduce a time shift between the pulses of the WDM signals carried by the optical carriers,
- modulation means (112, 113, 114) adapted to modify the optical power of the WDM signals,
- an optical spectral and temporal multiplexer/demultiplexer (120),
- a birefringent propagation medium (130) into which the WDM signals are injected in such a manner as to achieve a soliton trapping phenomenon, and
- absorption means (140) adapted to introduce optical losses into the components of the OTDM signal.

2. An optical device for converting an OTDM signal whose components are time shifted (t1, t2, t3, t4) and carried by the same wavelength ($\lambda4$) into WDM signals whose pulses are carried by different wavelengths ($\lambda1$, $\lambda2$, $\lambda3$, $\lambda4$), characterized in that it comprises:

- absorption means (140) adapted to introduce optical losses into the components of the OTDM signal,
- a birefringent propagation medium (130) into which the OTDM signal is injected in such a manner as to achieve a soliton trapping phenomenon,
- an optical spectral and temporal multiplexer/demultiplexer (120), and
- modulation means (112, 113, 114) adapted to modify the optical power of the WDM signals.

3. A device according to claim 2, characterized in that it further comprises shifting means (102, 103, 104) adapted to introduce a time shift between the pulses of the WDM signals carried by the optical carriers.

4. A device according to any preceding claim, characterized in that the shifting means (102, 103, 104) comprise variable delay lines.

5. A device according to any preceding claim, characterized in the modulation means (112, 113, 114) comprise variable attenuators.

6. A device according to any preceding claim, characterized in that it further comprises a polarization controller at the entry of the birefringent propagation medium (130) to encourage the injection of WDM/OTDM signals into said propagation medium with a polarization at 45° to its main axes.

7. A device according to any preceding claim, characterized in that the absorption means (140) comprise an electro-absorption modulator (MEA).

8. A device according to any one of claims 1 to 6, characterized in that the absorption means (140) comprise a saturable absorber.

9. A method of converting WDM signals, whose pulses are simultaneous and carried by different wavelengths ($\lambda 1$, $\lambda 2$, $\lambda 3$, $\lambda 4$), into an OTDM signal, whose components are time shifted and carried by the same wavelength ($\lambda 4$), by means of the device according to any one of claims 1 to 8, which method is characterized in that it comprises the steps of:

- time shifting the pulses of the WDM signals carried by the optical carriers,

- attenuating the WDM signals in order for them to have different optical powers,
- spectrally and temporally multiplexing the WDM signals,
- injecting the wavelength division multiplex obtained into the birefringent propagation medium in such a manner as to achieve a soliton trapping phenomenon and obtain an OTDM signal, and
- equalizing the optical power of the components of the OTDM signal obtained.

10. A method of converting an OTDM signal, whose components are time shifted (t1, t2, t3, t4) and carried by the same wavelength ($\lambda 4$) into WDM signals, whose pulses are carried by different wavelengths ($\lambda 1$, $\lambda 2$, $\lambda 3$, $\lambda 4$), by means of the device according to any one of claims 2 to 8, characterized in that it comprises the steps of:

- attenuating the components of the OTDM signal in such a manner that they have different optical powers,
- injecting the OTDM signal into the birefringent propagation medium in such a manner as to achieve a soliton trapping phenomenon and recover a wavelength division multiplex,
- spectrally and temporally demultiplexing the wavelength division multiplex in such a manner as to obtain a plurality of WDM signals whose pulses are time shifted and carried by different wavelengths, and
- equalizing the optical power of the pulses of the WDM signals obtained.

11. A method according to claim 10, characterized in that it further consists in time shifting the pulses of the WDM signals carried by the resulting optical carriers in such a manner as to render them simultaneous.